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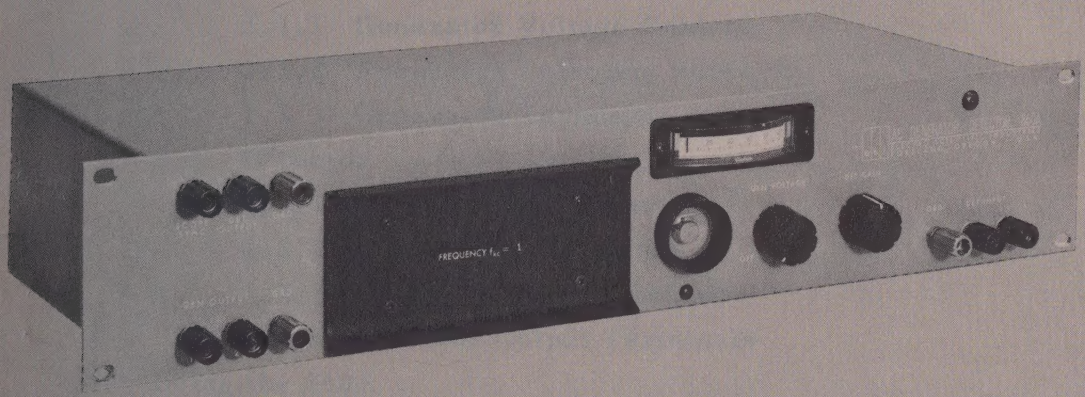
Instruction Manual

Electro Scientific Industries

7524 S. W. MACADAM AVE. • PORTLAND 19, OREGON

BRIDGES
AND
ACCESSORIES

APRIL 1963



Model 860 A

AC GENERATOR-DETECTOR

MP MASTER
MA30766

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INSTRUCTION MANUAL

for

MODEL 860A AC GENERATOR AND DETECTOR

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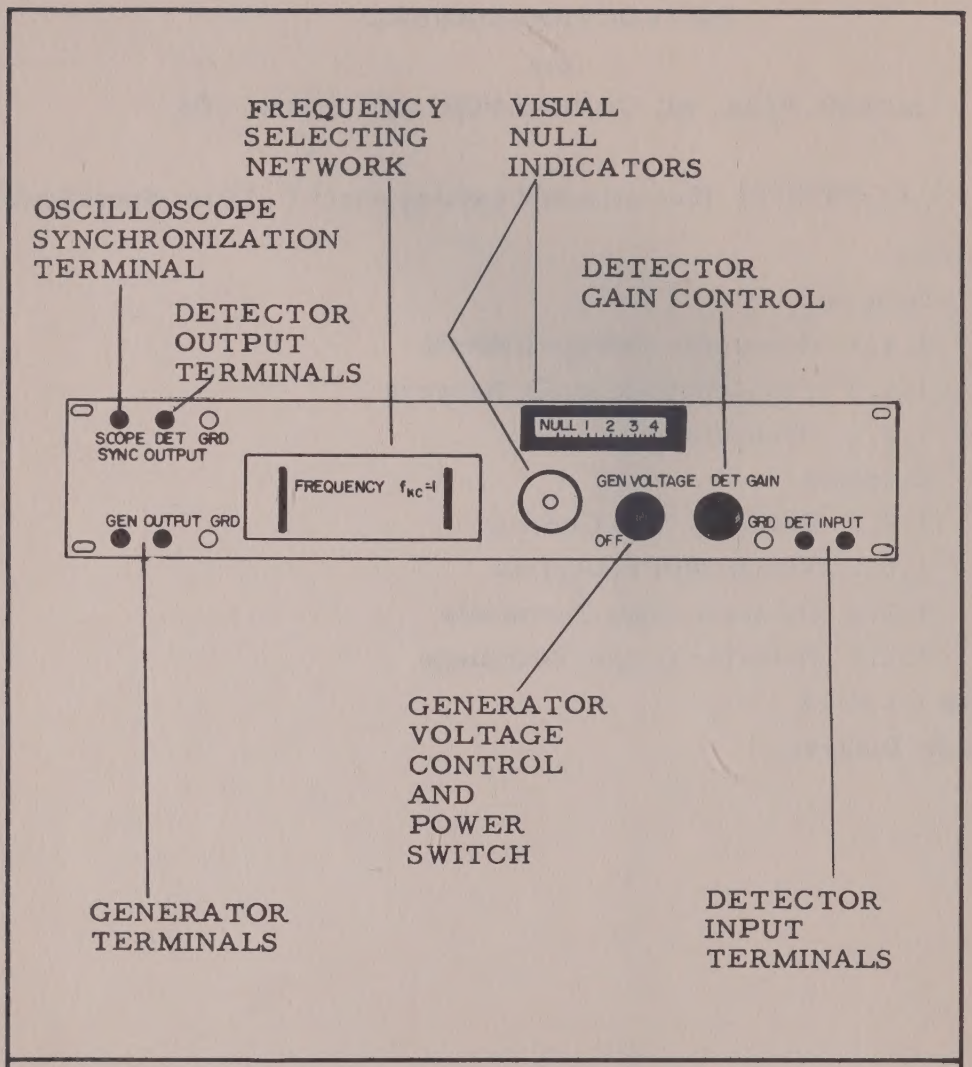


MODEL 860A AC GENERATOR AND DETECTOR PANEL CONTROLS

1. CONTROLS

1.1 GENERATOR

1.1.1 Generator Voltage Control: The left hand knob controls the output voltage of the generator and operates the external power switch.

1.1.2 Frequency Selecting Network: The plug-in unit determines the operating frequency of both the generator and detector.

1.1.3 Generator Terminals: The lower left hand terminals are for connecting the generator to the bridge circuit. Both generator terminals are insulated from, and have low capacitance to, ground. A ground terminal is provided for shield connections.

1.2 DETECTOR

1.2.1 Detector Gain Control: The right hand knob varies the sensitivity of the lower half of the eye tube and the meter null indicator.

1.2.2 Visual Null Indicator: The dual electron ray null indicator provides an extremely broad range of sensitivity. The upper eye responds to large signals and lower eye and meter responds to very weak signals. A null is indicated by the maximum opening of both eyes and null reading on the meter.

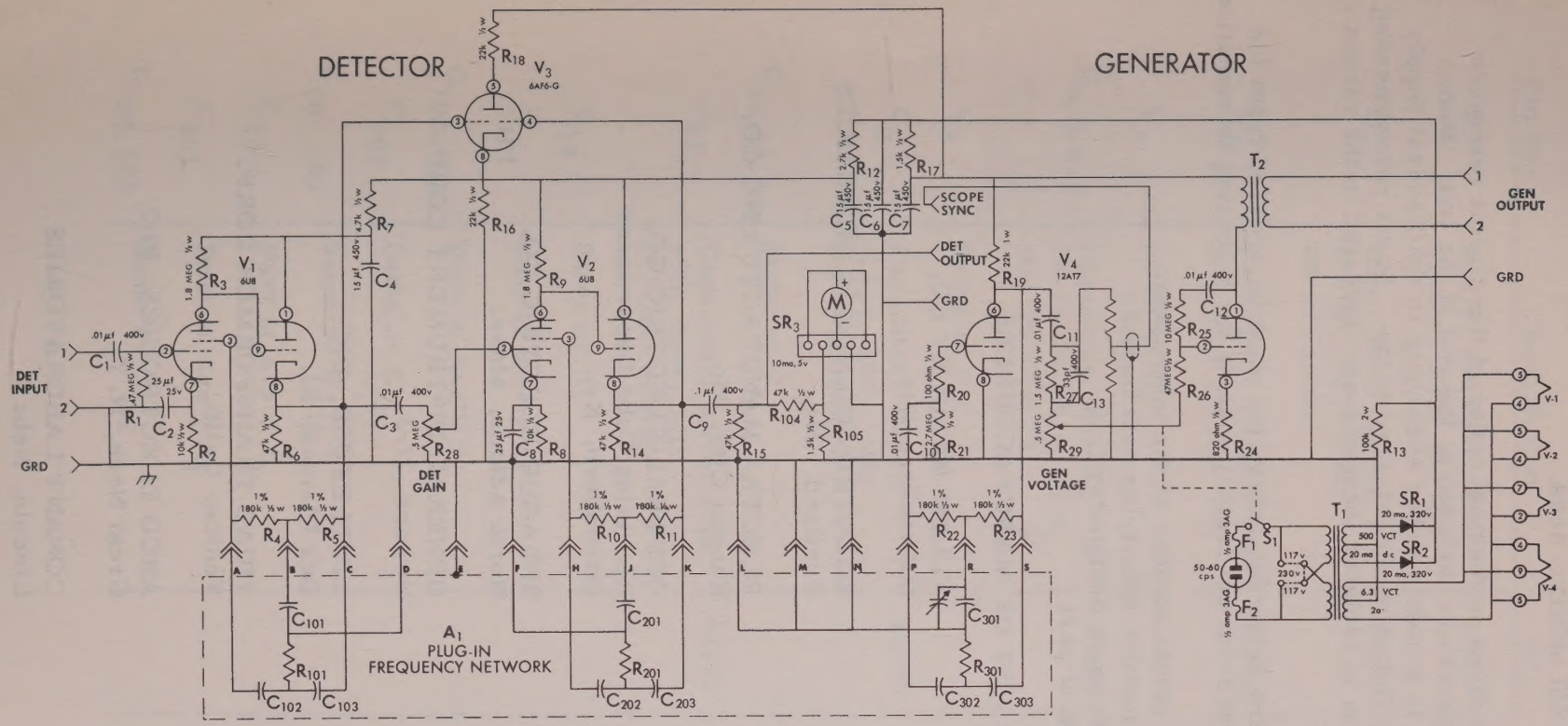
1.2.3 Detector Input Terminals: The lower right hand terminals are used for connecting the bridge circuit to the detector. The left hand terminal of this pair is internally grounded at the first stage of the amplifier. To minimize ground loop errors, the bridge circuit should be grounded only through this terminal. The terminal marked GRD is connected directly to the panel, and is provided for shield connections.

1.2.4 Detector Output Terminals: The upper left hand terminals are for connecting an oscilloscope or other indicator to the output of the detector amplifier. They are in parallel with the lower eye and meter null indicators.

1.2.5 Oscilloscope Synchronization Terminal: Between the upper left hand terminal and GRD a synchronizing signal for an oscilloscope is available. The null signal can be presented as a Lissajous elipse or a synchronized sine wave on an external oscilloscope.

2. USING THE 860A AC GENERATOR AND DETECTOR

CONNECT GENERATOR OUTPUT AND DETECTOR INPUT TO BRIDGE	Set generator voltage control to off for safety.
SET GENERATOR VOLTAGE CONTROL SO THAT THE REFERENCE MARK IS POINTED UP	This turns on the power supply, and provides sufficient generator voltage for most measurements.
SET DETECTOR GAIN CONTROL SO THAT THE REFERENCE MARK IS POINTED UP	This provides sufficient detector sensitivity for most measurements.
BALANCE BRIDGE	The null is indicated by maximum opening of both eyes and a NULL reading on the meter. The pattern edges of the eye will be sharp at null but will remain fuzzy for a minimum which is not a true null.
IF ADDITIONAL SENSITIVITY IS NEEDED, INCREASE THE GENERATOR VOLTAGE AND/OR DETECTOR GAIN	Maximum sensitivity may be needed for bridge measurements of very high or very low impedances.



Model 860A AC GENERATOR-DETECTOR CIRCUIT DIAGRAM

PARTS LIST
ESI MODEL 860A

The following parts list is in alpha-numerical order of the circuit reference designator. Miscellaneous parts are included at the end of the list. Manufacturer of the part is given in a code number according to the Federal Supply Code for Manufacturers; see list of manufacturers below. Parts recommended as spares to sustain operation in isolated locations are indicated in the recommended spare parts column.

Parts manufactured by Electro Scientific Industries must be ordered from the factory. When ordering parts from the factory include the following information:

Model and serial number of the instrument
Electro Scientific Industries part number
Circuit reference designator
Description of part

CODE LIST OF MANUFACTURERS

01121	ALLEN-BRADLEY CO. Milwaukee, Wis.
11837	ELECTRO SCIENTIFIC INDUSTRIES Portland, Ore.
19701	ELECTRA MANUFACTURING CO. Kansas City, Mo.
33173	GENERAL ELECTRIC CO. Receiving Tube Department Owensboro, Ky.
56289	SPRAGUE ELECTRIC CO. North Adams, Mass.
72699	GENERAL INSTRUMENT CORP. Newark, N.J.
75915	LITTLEFUSE, INC. Des Plaines, Ill.
81095	TRIAD TRANSFORMER CORP. Venice, Calif.
84171	ARCO ELECTRONICS, INC. Great Neck, N.Y.
88141	CONANT LABORATORIES Lincoln, Nebr.

Ckt Ref	Description	Mfr	ESI Part No.	Qty Used	Recm SP
A_1	Ass'y, Network, Frequency, Plug-In, 1kc	11837	3400	1	
C_1	Capacitor, Paper, 0.01μf, 400v, Mfr PN 67P10304	56289	1946	6	
C_2	Capacitor, Elect., 25μf, 25v, Mfr PN TE 1207	56289	1941	2	
C_3	Same as C_1				
$C_{4,5,6,7}$	Capacitor, Elect., 15-15-15-15μf, 450v, Mfr PN 448778	56289	5273	1	
C_8	Same as C_2				
C_9	Capacitor, Paper, 0.1μf, 200v, Mfr PN 191P10492S2	56289	1430	1	
$C_{10,11,12}$	Same as C_1				
C_{13}	Capacitor, Mica, 33pf ±5%, 400v, Mfr PN CM15E330J	84171	1944	1	
C_{14}	Same as C_1				
C_{101}	Part of Ass'y A_1			2	
$C_{102,103}$	Part of Ass'y A_1			6	
C_{201}	Same as C_{101}				
$C_{202,203}$	Same as C_{102}				
C_{300}	Part of Ass'y A_1			1	
C_{301}	Part of Ass'y A_1			1	
$C_{302,303}$	Same as C_{102}				

Ckt Ref	Description	Mfr	ESI Part No.	Qty Used	Recm SP
$F_{1,2}$	Fuse, 1/2 amp, Mfr PN 3AG	75915	1802	2	5
M_1	Meter	11837	3140	1	
$SR_{1,2}$	Rectifier, Selenium, 20ma, 320v, Mfr PN 20Y7746	72699	2535	2	
SR_3	Rectifier, Bridge, Selenium Mfr PN Type B	88141	1805	1	
R_1	Resistor, Fxd, Comp, 470k±10%, 1/2w, Mfr PN EB 4741	01121	2030	2	
R_2	Resistor, Fxd, Comp, 10k±10%, 1/2w, Mfr PN EB 1031	01121	1961	2	
R_3	Resistor, Fxd, Comp, 1.8 meg ± 10%, 1/2w, Mfr PN EB 1851	01121	2034	2	
$R_{4,5}$	Resistor, Fxd, Deposited Carbon, 180k±1%, 1/2w, Mfr PN DC 1/2C	19701	2032		
R_6	Resistor, Fxd, Comp, 47k±10%, 1/2w, Mfr PN EB 4731	01121	1958	4	
R_7	Resistor, Fxd, Comp, 4.7±10%, 1/2w, Mfr PN EB 4721	01121	1968	1	
R_8	Same as R_2				
R_9	Same as R_3				
$R_{10,11}$	Same as R_4				
R_{12}	Resistor, Fxd, Comp, 2.7k±10%, 1/2w, Mfr PN EB 2721	01121	2013	1	

Ckt Ref	Description	Mfr	ESI Part No.	Qty Used	Recm SP
R_{13}	Resistor, Fxd, Comp, 100k±10%, 2w, Mfr PN HB 1041	01121	2034	1	
$R_{14, 15}$	Same as R_6				
R_{16}	Resistor, Fxd, Comp, 22k±10%, 1/2w, Mfr PN EB 2231	01121	2018	2	
R_{17}	Resistor, Fxd, Comp, 1.5k±10%, 1/2w, Mfr PN EB 1521	01121	1976	2	
R_{18}	Same as R_{16}				
R_{19}	Resistor, Fxd, Comp, 22k±10%, 1w, Mfr PN GB 2231	01121	2019	1	
R_{20}	Resistor, Fxd, Comp, 100Ω±10%, 1/2w, Mfr PN EB 1011	01121	1977	1	
R_{21}	Resistor, Fxd, Comp, 2.7 meg±10%, 1/2w, Mfr PN EB 2751	01121	1971	1	
$R_{22, 23}$	Same as R_4				
R_{24}	Resistor, Fxd, Comp, 820Ω±10%, 1/2w, Mfr PN EB 8211	01121	2011	1	
R_{25}	Resistor, Fxd, Comp, 10 meg±10%, 1/2w, Mfr PN EB 1061	01121	2031	1	
R_{26}	Same as R_1				
R_{27}	Resistor, Fxd, Comp, 1.5 meg±10%, 1/2w, Mfr PN EB 1551	01121	2035	1	

Ckt Ref	Description	Mfr	ESI Part No.	Qty Used	Recm SP
R_{28}	Resistor, Var, 0.5 meg, Mfr PN J 66044	01121	3512	1	
R_{29}	Resistor, Var, 0.5 meg, Mfr PN JS 66045	01121	3513	1	
R_{101}	Part of Ass'y A_1			2	
R_{104}	Same as R_6			1	
R_{105}	Same as R_{17}				
R_{201}	Same as R_{101}				
R_{301}	Part of Ass'y A_1			1	
S_1	Switch, Part of R_{29}				
T_1	Transformer, Power, Mfr PN 8504	81095	2514	1	
T_2	Transformer, Output, Mfr PN 2996	81095	2675	1	
$V_{1,2}$	Tube, Electron, 6U8	33173	5275	2	
V_3	Tube, Electron, 6AF6G	33173	5274	1	
V_4	Tube, Electron, 12AT7	33173	5276	1	
	MISCELLANEOUS				
	Knob	11837	1268	2	
	Cap, Binding Post, Ins	11837	1170	6	3
	Cap, Binding Post, Metal	11837	1172	3	2
	Binding Post	11837	1393	9	
	Shield, Eye Tube	11837	2755	1	
	Insulator, Binding Post	11837	8823	6	

CLAIM FOR DAMAGE IN SHIPMENT

This instrument should be tested upon receipt. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be forwarded to us by the claim agent. We will then advise you of the disposition to be made and arrange for repair or replacement. Include model and serial number when referring to this instrument.

WARRANTY

Electro Scientific Industries, Inc. warrants each instrument and component parts to be free from defects in material and workmanship. Electro Scientific Industries, Inc. will service any instrument and replace parts thereof (except tubes, fuses and batteries) which shall, within one year after making delivery to the original purchaser, prove to be unsatisfactory.

If the fault has been caused by misuse or abnormal conditions or operation, a nominal charge will be made for repairs. In this case, an estimate will be submitted before making such repairs.

Electro Scientific Industries, Inc. reserves the right to make changes in design at any time without incurring obligation to modify units previously purchased.

Electro Scientific Industries

7524 S. W. Macadam Avenue • Portland 19, Oregon

ESI instruments are carefully engineered and made to the most exacting standards of workmanship and accuracy in a modern and well-equipped factory.

Field Engineers are maintained in principal cities as a service to our customers. Customers are invited to contact our nearest field engineer or to consult our engineering staff for further information regarding ESI instruments and their applications.

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